

## Appendix R

### Guide to SI Unit for Radiation Protection

#### Introduction to SI Units

SI (System International) units comprise the primary measurement system for most countries. The system is also finding increasing use in the United States. State and federal regulatory agencies, including the Agency and the U.S. Nuclear Regulatory Commission, have adopted SI units for radiation measurements; other agencies (e.g., the U.S. Department of Transportation) require their use.

#### Common Radiological Unit Prefixes

Submultiples				Multiples			
m	Milli	$10^{-3}$	thousandth	k	kilo	$10^3$	thousand
$\mu$	Micro	$10^{-6}$	millionth	M	mega	$10^6$	million
n	Nano	$10^{-9}$	thousand millionth	G	giga	$10^9$	thousand million
p	Pico	$10^{-12}$	million millionth	T	tera	$10^{12}$	million million

#### Length

1 centimeter (cm)	=	0.3937 in	=	.03287 ft
1 meter (m)	=	100 cm	=	39.37 in = 3.281 ft
1 inch (in)	=	2.54 cm	=	0.254 m
1 foot (ft)	=	30.48 cm	=	0.3048 m

#### Activity

The traditional unit is the Curie (Ci); the SI unit is the Becquerel (Bq)

$1 \text{ Ci} = 3.7 \times 10^{10} \text{ Bq} = 37 \text{ GBq}$        $1 \text{ Bq} = 1 \text{ disintegration per second} = 2.7027 \times 10^{-11} \text{ Ci}$  or  $\approx 27 \text{ pCi}$

To convert Bq to Ci, divide the Bq figure by  $37 \times 10^9$  (or multiply the Bq figure by  $2.7027 \times 10^{-11}$ )

To convert Ci to Bq, multiply the Ci figure by  $37 \times 10^9$

OLD (Curie)	1 pCi	27 pCi	1 nCi	27 nCi	1 $\mu$ Ci	27 $\mu$ Ci	1 mCi	27 mCi	1 Ci	27 Ci
NEW (becquerel)	37 mBq	1 Bq	37 Bq	1 kBq	37 kBq	1 MBq	37 MBq	1 GBq	37 GBq	1 TBq

#### Examples:

$9 \text{ mCi} = 333 \text{ MBq} = 0.333 \text{ GBq}$   
 $44 \text{ mCi} = 1628 \text{ MBq} = 1.63 \text{ GBq}$

$10 \text{ mCi} = 370 \text{ MBq} = 0.37 \text{ GBq}$   
 $50 \text{ mCi} = 1850 \text{ MBq} = 1.85 \text{ GBq}$

## Activity (continued)

**Table A**

**Table B**

Curie Units	Becquerel Units
μCi	kBq
mCi	MBq
Ci	GBq
0.1	3.7
0.25	9.25
0.5	18.5
0.75	27.75
1	37
2	74
3	111
5	185
7	259
10	370
20	740
25	925

From Table A: 0.1 mCi = 3.7 MBq  
0.1 Ci = 3.7 GBq

Curie Units	Becquerel Units
μCi	MBq
mCi	GBq
Ci	TBq
50	1.85
60	2.22
100	3.7
200	7.4
250	9.25
500	18.5
800	29.6
1000	37

From Table B: 50 mCi = 1.85 GBq  
3.7 MBq = 100 μCi

**To convert from one unit to another, read across from one column to the other, ensuring the units are in the same line of the column headings.**

## Radiation Dose Equivalent

The traditional unit is the rem; the SI unit is the sievert (Sv).

1 rem = 0.01 sievert (Sv) = 10 mSv

100 rem = 1 Sv = 0.01 Sv

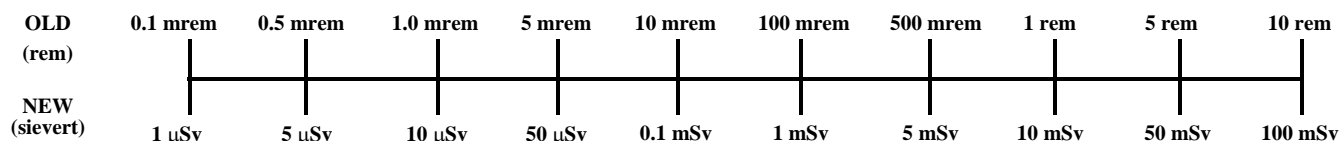
500 rem = 5 Sv = 0.5 mSv

1 rad = 0.01 gray (Gy) = 10 mGy

100 rads = 1 Gy = 0.01 Gy

500 rads = 5 Gy = 0.5 mGy

The working SI unit is the sievert (Sv)



## Surface Activity

